AMERICAN JOURNAL OF PHARMACY

and

THE SCIENCES SUPPORTING PUBLIC HEALTH

SINCE
1825

"CUNDEAMOR"
MOMORDICA CHARANTIA L.

Pictured above is a plant which is used in Puerto Rico in the empirical treatment of diabetes mellitus. This issue carries an article by Dr. Gilberto Rivera which illustrates the effect of an extract of this drug on the blood sugar of rabbits.

MARCH
1942

Preparing for tomorrow

TODAY

EVERYONE IN THE UNITED STATES has, by this time, felt the influence of War upon his "daily doings." "Business as usual" is a phrase discarded, for business, industry, education and everything else follow their ordinary procedures now only after the demands of national defense have been satisfied.

☆ Modern warfare is waged not alone in trench and plane, at the guns, on ships and under seas. It is waged also in the bomb shelter, on the farm and in the factory, in the office and in the classroom. And the function of education in time of national and international emergency becomes doubly important for, unlike other endeavors, which are striving chiefly to meet the present emergency, the classroom is preparing students for the demands of the day ahead and to carry on whether the crisis be protracted or not.

☆ War, they say, is chemist-fabricated. So, too, may peace be some day synthesized, for tomorrow the scientist will create the very things that nations today fight to possess. In the meantime, the urgent needs of the present and the certain challenge of the future must be imparted to those who are studying science or who are about to launch upon an educational career in that field.

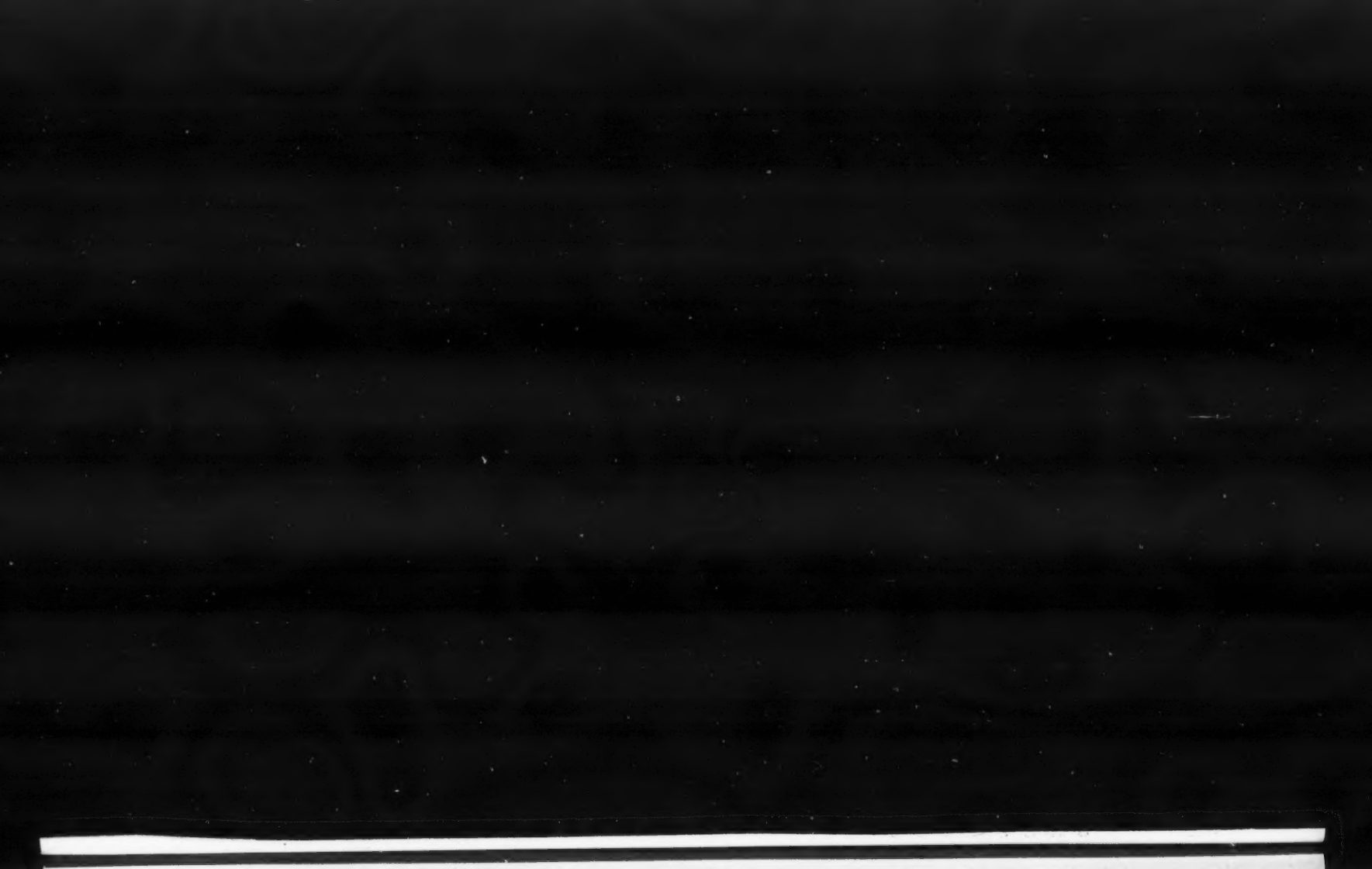
☆ The health and morale of the people of this Nation, now and in the future, must be preserved. The challenges of a post-war period must be anticipated and prepared for. The sciences of pharmacy, chemistry, bacteriology and biology are those which will be called upon most urgently, and the personnel of these four major fields must and will be ready.

☆ To those young men who can plan such a life-work, and to those young women who are seeking something really constructive and worthwhile for the future, we recommend these courses of study, which will make available untold opportunities for service as well as for successful and interesting careers.

Philadelphia College of Pharmacy and Science

43rd Street, Kingsessing and Woodland Avenues

Philadelphia, Penna.



IN Anorexia

. . . *"Receiving thankfully all that physiology or chemistry or any other science can give us, let us still hold that that alone is true which is proved clinically, and that which is clinically proved needs no further evidence."*

— SIR JAMES PAGET

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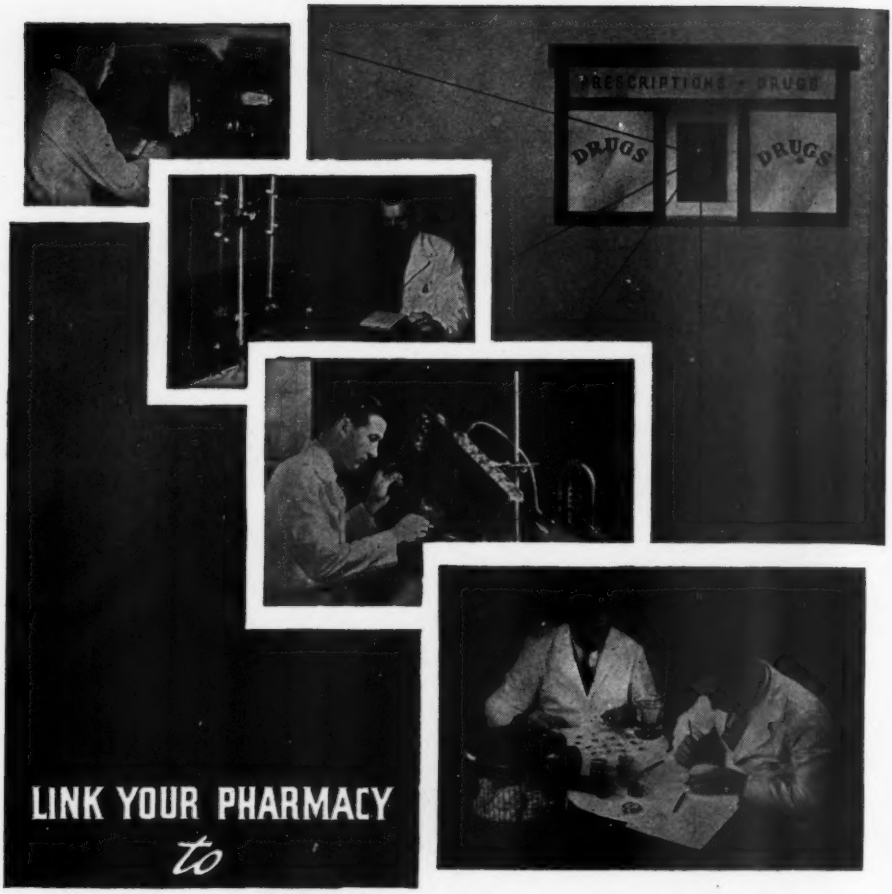

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CONTENTS

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EDITORIAL

WE MUST MAINTAIN OUR STANDARDS

ONE of the very real dangers that confronts the profession of pharmacy as a result of the present emergency is the tendency which is already evident to lower our professional and educational standards.

Everyone is fully agreed that pharmacy must fulfill its responsibilities and make certain sacrifices in the interest of national efficiency and welfare and this is being done with commendable willingness and cooperation. Thus in the face of the mounting demand for pharmacists both in the army as well as in essential civilian posts most of our educational institutions are abandoning their time honored "teaching as usual" program and are planning to convert themselves into continuous-operation units, eliminating vacation periods for both students and faculty. In almost every case this entails serious economic and administrative difficulties to the college as well as financial problems to many a pharmacy student. These problems are and will be courageously met as one of the challenges of the times.

It is, however, understood in educational circles that acceleration shall not and must not mean lowering either the quality or quantity of instruction given the student. To do this would be fatal. One thing is certain and that is if we are to continue in the process of improving our profession and developing its proper recognition by other professional circles we must never revert to the days when pharmaceutical education was little else than a vocational training program. Much of the progress that has been made in recent years may be directly attributed to our improvement educationally and it may be truthfully said that the recognition of pharmacy on the campus has led to its recognition by the other professions of public health.

With the pressure for needed man-power which is being felt with ever increasing force we may well expect to see certain groups, interested only in their continued exploitation of pharmacy, demanding all sorts of steps to alleviate their need of low cost personnel,

with no thought and less care as to its effect on what we have labored so carefully to build—real professional status.

For example, already in one southern state a bill has been introduced permitting qualified assistants to become registered pharmacists by examination, without fulfilling the educational requirements. This sort of thing is the most vicious and damaging thing to the whole of pharmacy that one can possibly imagine. It is the kind of easy virtue so prevalent amongst some pharmacists which makes us the laughing stock of other professions. Either the fundamental reasoning that the public welfare can only be safeguarded by properly educated and trained men is correct or else it is totally incorrect—*there can be no equivocation.* Can anyone imagine physicians asking for or even permitting legislation enabling a well qualified nurse to practice medicine? No! And there is just as little rhyme and reason to this as there is to a qualified assistant being allowed to practice pharmacy, unsupervised.

Nothing but a firm, united stand by those who believe in pharmacy can prevent a complete washout of our professional standards. If we do not meet this issue determinedly right now, without compromise, this will be our "Munich" and great will be our future sorrow and shame.

L. F. Tice

PRELIMINARY CHEMICAL AND PHARMACOLOGICAL STUDIES ON "CUNDEAMOR," MOMORDICA CHARANTIA L. PART II.

In a previous issue Part I of this paper presented the chemical investigation of this drug used empirically in Puerto Rico for the treatment of diabetes mellitus. The following describes the pharmacological studies on the blood sugar of rabbits.

By Gilberto Rivera

Introduction

IN a previous paper published in this journal (1) the history of this drug, the botanical description, a preliminary histological description of the leaf, and a brief summary of the chemical findings were given.

In this paper the toxicological tests and the effect of the drug on the sugar tolerance of normal rabbits are presented. There is evidence that the drug exerts some hypoglycemic action on rabbits and that such action is enhanced when a crude srystalline substance extracted from the drug is used.

It appears that the results thus far obtained suggest that the drug may have beneficial clinical application in diabetes. However, we wish to emphasize that the work has not reached the point where definite assurance can be given that the drug possesses insulin-like properties.

Brief History on the Investigation of Insulin Substitutes

In 1889 Mering and Minkowski (2) showed that depancreatized dogs presented symptoms identical with those of diabetes mellitus. Attempts were made to prepare extract of pancreas for the treatment of the disease. It was in 1922 that Banting and Best (3) obtained the substance today called insulin.

The discovery of insulin started a new era in pharmacological, clinical and chemical research; great advances have been attained in its methods of preparation, standardization and prolongation of clinical effect. Not much progress has been achieved on the mechanism of its essential action, nor the possibility of preparing a compound of insulin suitable for oral administration.

Among the difficulties of the treatment with insulin by subcutaneous injection, the most common are:

(a) Controlled diet, which unintelligent patients do not like to follow.
(b) Continued administration more than once a day and for an indefinite time.
(c) Insulin atrophies.
(d) Occasional and unavoidable occurrence of hypoglycemia.

Due to these difficulties, unsuccessful attempts have been made to find a drug or organic substance suitable for the treatment of diabetes mellitus by oral treatment.

In 1922 Hepburn (4) started the study of Alkatan, reputed to be of value as an antidiabetic. Negative results were obtained with this drug. In 1924 Hepburn (5) reported some work on the chemistry of the above plant. Among other findings it was demonstrated that in alkatan no alkaloid was present. In 1929 Bischoff (6) and co-workers studied the hypoglycemic properties of reglykol, pancrepatine and papaw, commercial products alleged to be antidiabetic. The results showed conclusively that such products had no hypoglycemic action when administered orally to rabbits. Rolli (7) in 1929 studied the comparative effects of synthalin and insulin on the depancreatized dog. Negative results for synthalin were obtained. Long and Bischoff (8) in 1930 studied the insulin-like properties of uvarsin, oxycatalyase and solanum sanitwongsei berries, the results showing that these substances can hardly be regarded as substitutes for insulin.

In China, a careful study of antidiabetic drugs used in Chinese medicine has been conducted by Noriyuki Sugihara (9) (10) (11), Sugihara and Kashokukin (12), and Sugihara and Shigeo Hirano (13) (14). No less than thirty-one drugs were studied; only one, *Rehmannia tulea,* reduced the blood sugar from the beginning. This drug decreased the hyperglycemia produced by ammonium chloride, but did not decrease adrenaline hyperglycemia.

Similar action was observed with *Phellodendron* lactone. Moreover, to quote the authors (14), "This lactone reduces distinctly the normal blood sugar of guinea pigs, rabbits and pigeons, but has no effect when the pancreas has been removed, apparently because the lactone acts by increasing insulin secretion."

In the last report of Collip (15) he announced the discovery of a new substance, prepared from pituitary tissue, which when given by mouth reduces blood sugar in rabbits and monkeys and also in a

few cases of diabetic individuals. "However," he reports, "the research had not reached the stage where the new substance could be used in treatment."

Other work in this field is summarized by Jensen (16), Hill and Howi (17) and by Braun and Rees (18).

While the literature dealing with the study of insulin-like substances is very vast, we have not seen any work done with *M. Charantia.*

In September, 1939, the author started a study with *M. Charantia.* During the first stage the work was entirely chemical, methods of separating active principles being studied.

In the empirical use of the plant, it has been observed that a few isolated cases, which have been recognized as chronic diabetics, have seemed to show improvement on taking the drug orally without any use of insulin. In chronic cases which have developed marked tolerance to insulin, the drug has also seemed of value. The most interesting fact about the use of *M. Charantia* is that it can be given orally, and dietary restrictions are not very important. These observations induced the writer to make a preliminary test of the effect of the drug and its preparations on the blood sugar of rabbits.

Experimental Data, Results and Discussion

The preliminary pharmacological study of the drug was limited to an observation of the activity of different fractions of it on the glucose tolerance of normal rabbits. The method of Long and Bischoff (6) for testing the hypoglycemic effect of products alleged to have insulin-like properties, was employed. The essential steps are as follows:

(1) Rabbits are fasted for twenty-four hours; (2) the following morning an initial blood sample is taken; (3) three grams of glucose per kilo of body weight is administered, via stomach tube, to each animal; (4) a sample of blood is removed from the marginal ear vein, initially and at the end of one, two, three, four, six, eight and ten hours; (5) the blood sugar is determined and a curve plotted; (6) a week later the glucose tolerance test is repeated, this time using the drug, and a second curve is plotted. The blood sugar was determined by the Folin Micro Method (19) as outlined by Keller (20).

The preliminary studies are presented in the following abstracted tables.

Summary and Results of Blood Sugar Tests of Trial A

Rabbit No.	Sugar Tolerance Tests and Drug per Os.	Blood Sugar Mgms. per 100 cc. 0 Hr.	1 Hr.	2 Hrs.	3 Hrs.	4 Hrs.	5 Hrs.	6 Hrs.	7 Hrs.
200	Sugar Tolerance Test	110	165	134	120	113	97	92	97
	50 cc. of a 10% infusion	109	128	191	138	99	126	108	102
201	Sugar Tolerance Test	105	162	132	88	97	92	93	92
	50 cc. of a 10% infusion	105	137	132	101	98	94	111	127
202	Sugar Tolerance Test	98	112	192	155	148	93	110	98
	50 cc. of a 20% infusion	105	141	129	99	111	107	104	114

In Trial A with rabbits Nos. 200, 201, 202, twenty grams of glucose was given because they were of high tolerance. Rabbits Nos. 200 and 201 each received 50 cc. of a 10 per cent. infusion of the drug, with rabbit No. 202 the dose was doubled.

Summary and Results of Blood Sugar Tests of Trial B

Rabbit No.	Sugar Tolerance Tests and Drug per Os.	Blood Sugar Mgms. per 100 cc. 0 Hr.	1 Hr.	2 Hrs.	3 Hrs.	4 Hrs.	5 Hrs.	6 Hrs.	7 Hrs.
203	Sugar Tolerance Test	92	169	350	94	87	92	92	92
	50 cc. of a 10% infusion	98	122	117	107	105	92	116	107
204	Sugar Tolerance Test	100	150	360	95	92	100	90	90
	50 cc. of a 10% infusion	95	157	132	100	109	102	111	107
205	Sugar Tolerance Test	90	160	375	98	105	120	95	95
	50 cc. of a 10% infusion	105	143	130	101	113	111	112	106

In Trial B with rabbits Nos. 203, 204, 205, all low tolerance animals, seven grams of glucose per animal was used, with 50 cc. of the 10 per cent. infusion. The infusion was prepared in the same manner as the diabetic patient uses the drug empirically. In early experiments the blood samples were taken initially and at the end of one, two, three, four, six, seven, eight, ten and twelve hours but in later experiments the blood was secured initially and at the end of one, two, three, four, five, six and seven hours. This change was made because the animals were shown to be normal at the end of five hours even in those cases where twenty grams of glucose had been given.

Summary and Results of Blood Sugar Tests of Trial C

Rabbit No.	Sugar Tolerance Tests and Drug per Os.	Blood Sugar Mgms. per 100 cc. 0 Hr.	1 Hr.	2 Hrs.	3 Hrs.	4 Hrs.	5 Hrs.	6 Hrs.	7 Hrs.
189	Sugar Tolerance Test	100	177	180	120	123	90	146	121
	1.069 gms. C. Hyp. Subs.	117	103	111	107	100	90	117	90
190	Sugar Tolerance Test	94	87	152	147	147	100	116	90
	1.069 gms. C. Hyp. Subs.	108	153	125	122	115	103	91	91
	0.2394 gm. C. C. Subs.	90	118	99	100	106	114	114	106
192	Sugar Tolerance Test	90	105	182	148	142	91	110	90
	1.069 gms. C. Hyp. Subs.	108	200	120	100	97	89	75	85
	0.2394 gm. C. C. Subs.	97	136	109	118	102	112	111	108
193	Sugar Tolerance Test	90	89	142	139	143	96	104	92
	1.069 gms. C. Hyp. Subs.	100	188	237	156	94	101	89	80
	0.2394 gm. C. C. Subs.	104	133	137	108	98	114	114	107
194	Sugar Tolerance Test	90	94	150	139	139	106	98	98
	1.069 gms. C. Hyp. Subs.	112	141	132	125	105	100	103	94
	0.2394 gm. C. C. Subs.	84	105	103	111	93	110	113	108

C. C. Subs. = Crude Crystalline Substance.
C. Hyp. Subs. = Crude Hypoglycemic Substance.

In Trial C with rabbits Nos. 189 (control), 190, 192, 193 and 194, the tests were carried on for three weeks. In the first week a glucose tolerance test was made using exactly three grams of glucose per kilo of body weight. In the second week, the glucose tolerance test was repeated while giving the drug per os. The drug was administered in the form of a crude, apparently hypoglycemic substance isolated from the drug, of which 1.069 grams was dissolved in 50 cc. of water. In the third week the same procedure was followed, but using 0.2394 grams, of a crude crystalline substance believed to be a hypoglycemic principle, dissolved in 50 cc. of water. Fixed conditions for the obtention of the crystalline substance have not been determined as yet, but the author is working towards that goal. A small amount (four grams) of a crystalline product was obtained from 800 grams of crude drug which had been put through the procedure of crystallization several times.

Summary and Results of Blood Sugar Tests of Trial D

Rabbit No.	Sugar Tolerance Tests and Drug per Os.	Blood Sugar Mgms. per 100 cc. 0 Hr.	1 Hr.	2 Hrs.	3 Hrs.	4 Hrs.	5 Hrs.	6 Hrs.	7 Hrs.
195	Sugar Tolerance Test	90	124	196	148	141	92	90	91
	1.52 gms. Impure Citrated Alkaloids	112	159	147	120	100	103	96	96
196	Sugar Tolerance Test	105	153	167	112	143	109	122	130
	1.52 gms. Impure Citrated Alkaloids	132	179	146	146	115	103	105	103
197	Sugar Tolerance Test	108	147	127	139	118	100	122	130
	1.52 gms. Impure Citrated Alkaloids	99	161	154	143	100	94	100	95
198	Sugar Tolerance Test	111	179	169	133	109	90	146	121
	1.52 gms. Impure Citrated Alkaloids	104	172	195	105	110	97	116	97
199	Sugar Tolerance Test	105	142	127	114	108	96	148	125
	3.04 gms. Impure Citrated Alkaloids	91	104	113	113	87	94	105	102
	Sugar Curve (fasted animal)	100	100	98	94	115	107	105	97

In Trial D with rabbits Nos. 195 (control), 196, 197, 198 and 199, the citrated form of a crude alkaloidal extract was given.

From the preliminary work on rabbits it appears that the drug possesses marked hypoglycemic properties, especially on animals of low tolerance. For example, in rabbit No. 203 the peak was lowered from 169 to 122 milligrams in the first hour, in the second hour from 350 to 117 milligrams. In rabbit No. 204 the lowering in the second hour was from 360 to 132 milligrams. In rabbit No. 205 the sugar dropped in the second hour from 375 to 130 milligrams. In all animals the blood sugar level was normal after the third hour. (See plates Nos. 21, 22 and 23.)

In case of animals of high tolerance the curves are irregular. For example, in Trial A (see plates Nos. 18, 19 and 20) the curves for rabbits Nos. 200 and 201 are very irregular. In rabbit No. 202 the dose of the drug was doubled and the curve is much more regular. It seems obvious that for high concentrations of sugar in the blood, the drug should be increased.

The most interesting results were obtained with the crude crystalline substance. (See plates Nos. 24, 25, 26, 27 and 28.) When this set of rabbits was given the apparently hypoglycemic substance

plus the glucose, per os, it was observed in the first hour that the peak obtained was elevated—that is, the drug appeared to be hyperglycemic. The writer thought at first that this abnormality was of a biochemical nature, that is a disturbance of the homeostasis of the blood sugar, probably by glycogenesis or glycogenolysis. Other workers in this field observed that the disturbance of the rabbit produced by inserting a stomach tube led to high values for sugar content. Still other workers have noticed that in "uneducated" rabbits insulin given in doses of three to five units, and even in doses of eight to ten units per kilo of body weight produces no hypoglycemic action in the first hour. To illustrate, it will be noticed that in rabbit No. 192 there occurs in the broken line a peak of 200 milligrams, but that in this same animal in the sixth hour the blood sugar was 75 milligrams. In rabbit No. 193 (uneducated) the peak was 236 milligrams. Hypothetically, the writer also assumed that a hyperglycemic substance present in the first preparation might also influence the preliminary peak, and this seems to be true, because in the same set of rabbits the crude crystalline substance lowers the peak of rabbit No. 190 from 153 to 118 milligrams; in rabbit No. 192, from 200 to 136 milligrams; in rabbit No. 193, from 188 to 137 milligrams; and in rabbit No. 194, with a double dose, there was no peak, the blood sugar being normal after the first hour and thereafter.

In Trial D (see plates Nos. 29, 30, 31, 32 and 33) with rabbits Nos. 195, 196, 197, 198 and 199 (control) it appears that the alkaloids present in the drug have no hypoglycemic properties at all. In rabbit No. 195, a dose of the drug was given in the second hour, this being the reason why a hypoglycemic effect was noticed. In the course of the experiment it was observed that no sugar was eliminated in the urine, and that there was no toxic effect as shown by analyses of the amino-acid nitrogen and urea nitrogen content, both of which were normal. Hence the hypoglycemia is not produced by an impairment of the liver function or the prevention of normal glyconeogenesis.

The author will continue this work with a yellow bitter substance, a crystalline substance and a glucoside, isolated from the drug. The effect in the blood sugar will be studied for each substance individually as well as in combination. A study of the action of the drug on the carbohydrate, nitrogen, glycogen metabolism, R. Q. and adrenalin hyperglycemia is also contemplated.

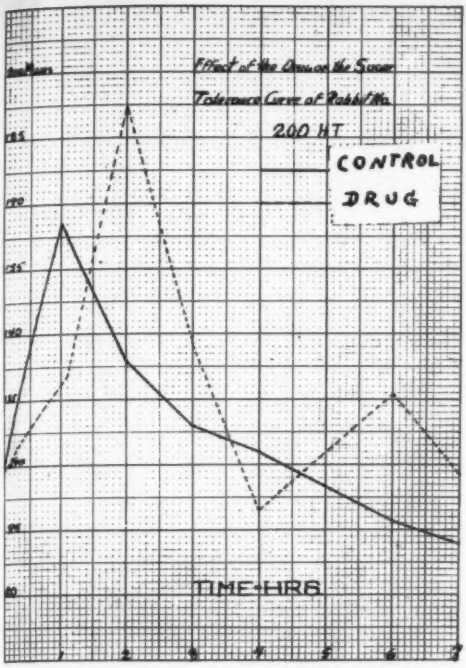

PLATE No. 18. Trial A, Effect of Drug on High Tolerance Rabbit No. 200.

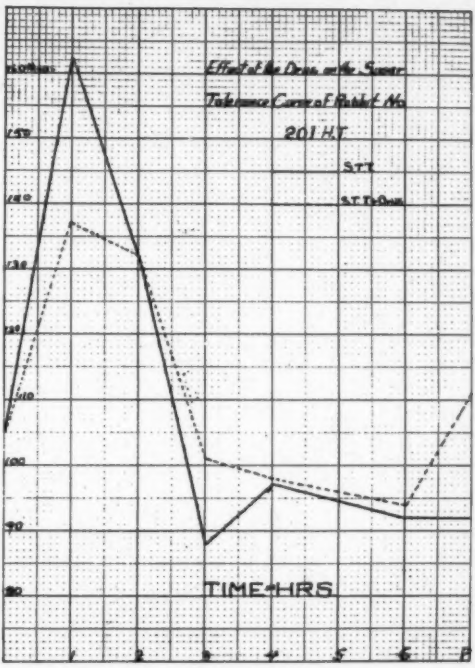

PLATE No. 19. Trial A, Effect of Drug on High Tolerance Rabbit No. 201.

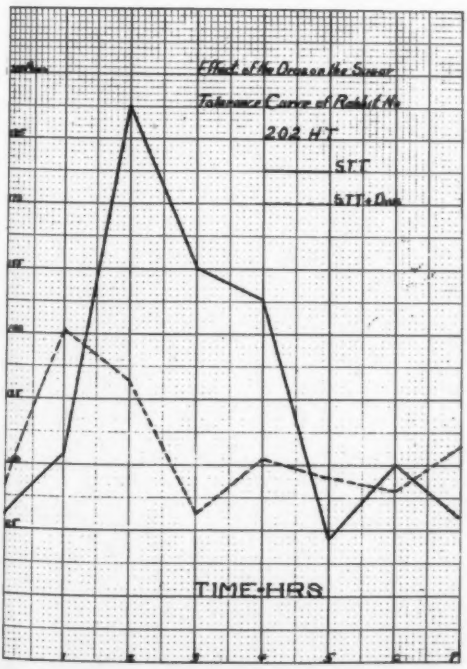

PLATE No. 20. Trial A, Effect of Drug on High Tolerance Rabbit No. 202.

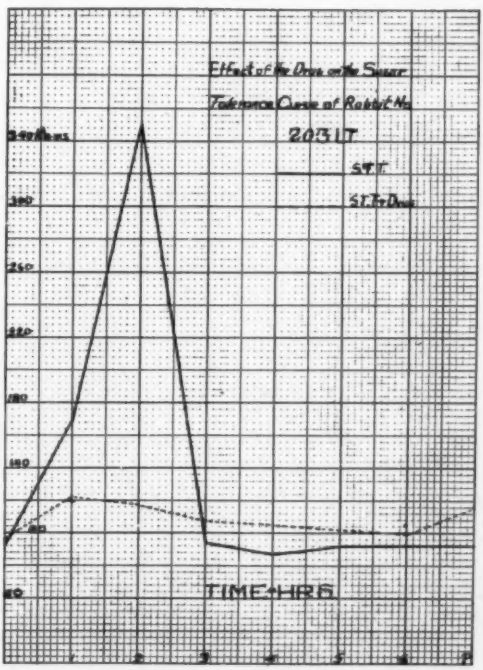

PLATE No. 21. Trial B, Effect of Drug on Low Tolerance Rabbit No. 203.

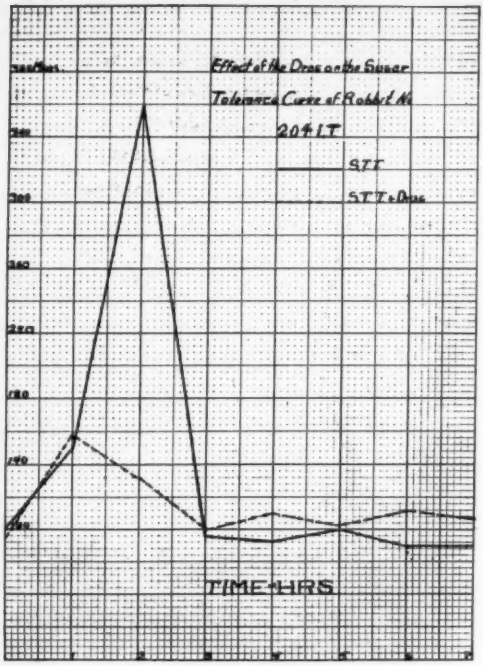

PLATE No. 22. Trial B, Effect of Drug on Low Tolerance Rabbit No. 204.

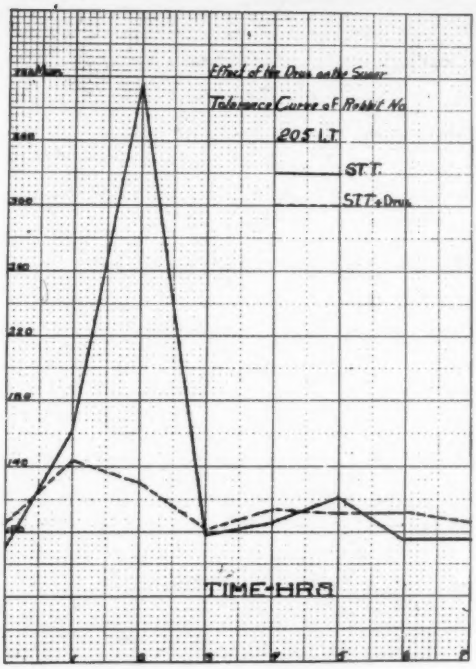

PLATE No. 23. Trial B, Effect of Drug on Low Tolerance Rabbit No. 205.

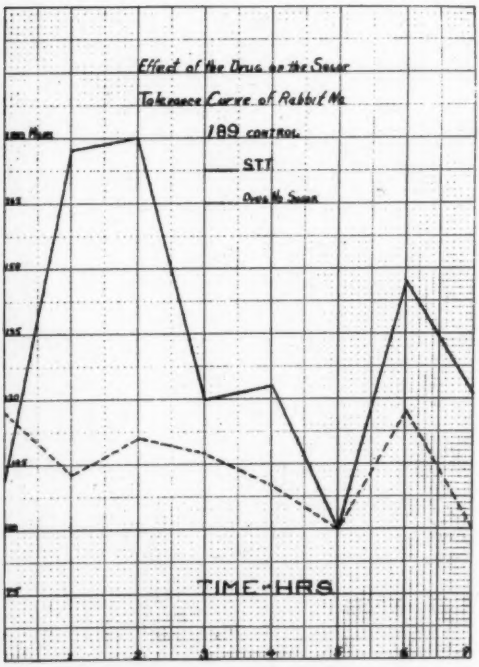

PLATE No. 24. Trial C, Rabbit No. 189 Control. Broken line shows effect of drug on a 24 hours fasted animal.

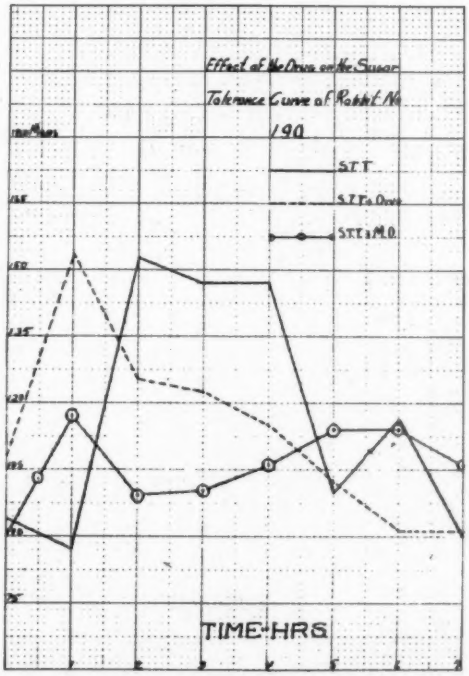

PLATE No. 25. Trial C, Rabbit No. 190. Broken line shows effect of crude drug and line with circles shows effect of the crude hypoglycemic substance per os.

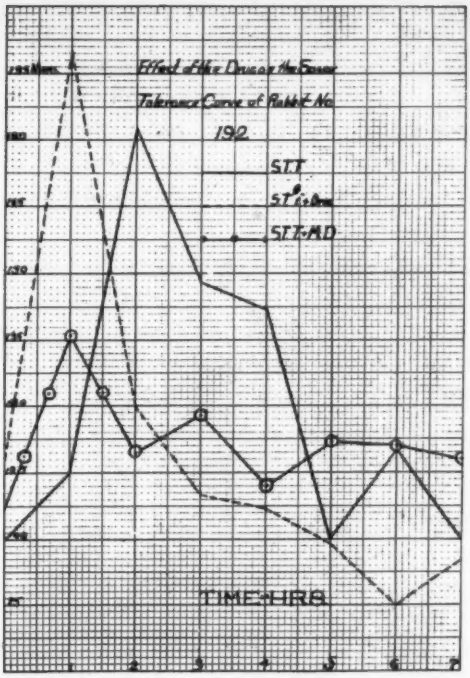

PLATE No. 26. Trial C, Rabbit No. 192. Broken line shows effect of crude drug, line with circles shows effect of the crude hypoglycemic substance per os.

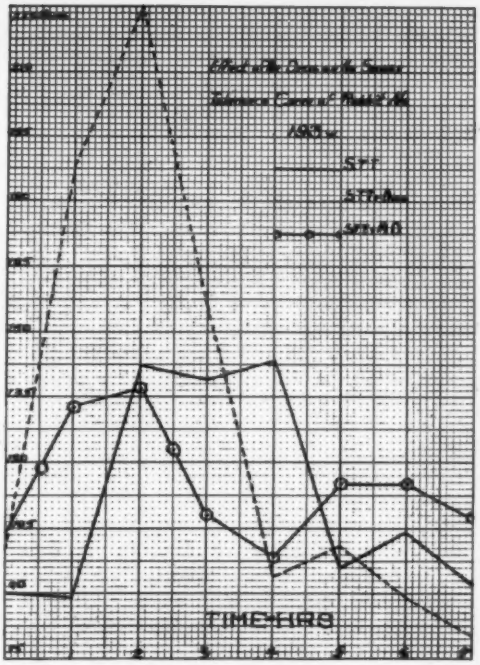

PLATE No. 27. Trial C, Rabbit No. 193. Broken line shows effect of crude drug, line with circles shows ffect of the crude hypoglycemic substance per os.

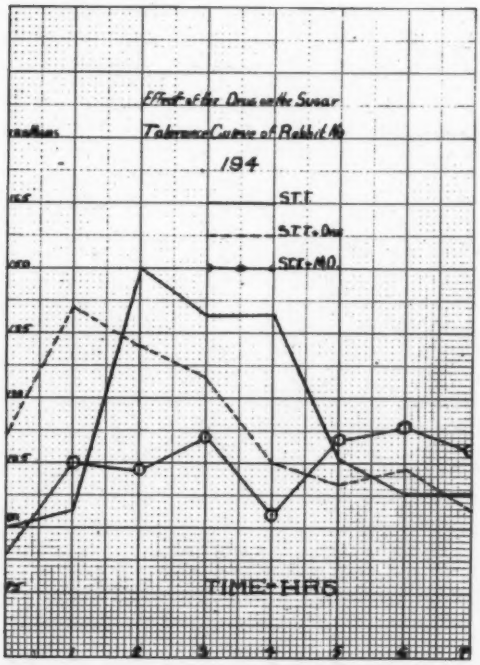

PLATE No. 28. Trial C, Rabbit No. 194. Broken line shows effect of crude drug, line with circles shows effect of the crude hypoglycemic substance per os.

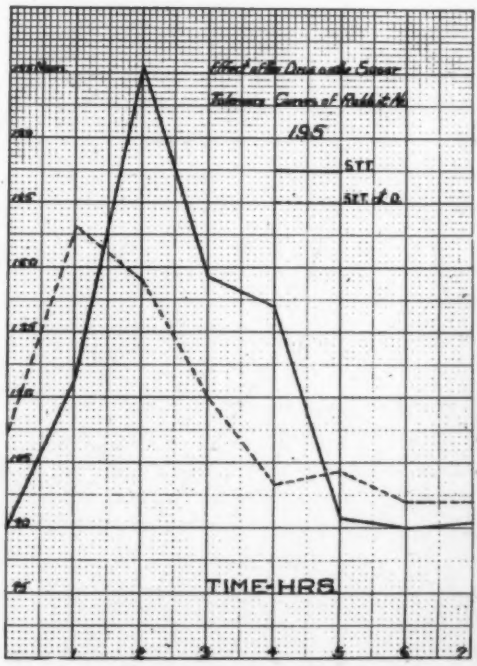

PLATE No. 29. Trial D, Rabbit No. 195. Effect of the citrated alkaloids on the blood sugar.

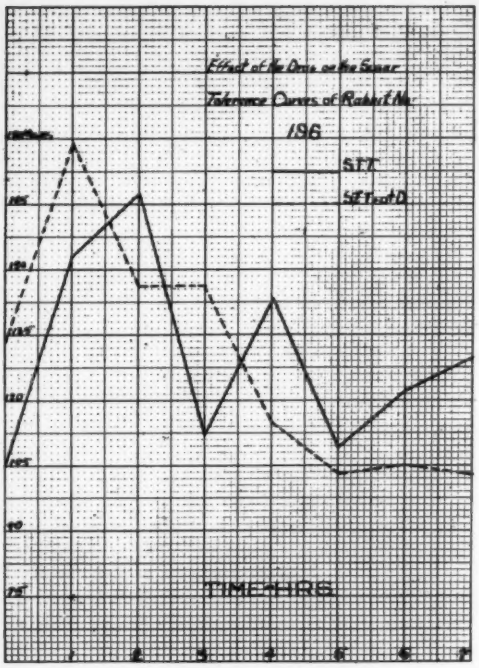

PLATE No. 30. Trial D, Rabbit No. 196. Effect of the citrated alkaloids on the blood sugar.

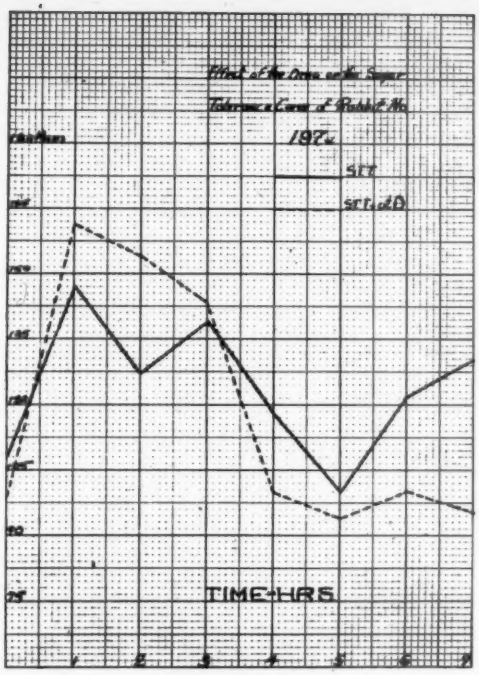

PLATE No. 31. Trial D, Rabbit No. 197. Effect of the citrated alkaloids on the blood sugar.

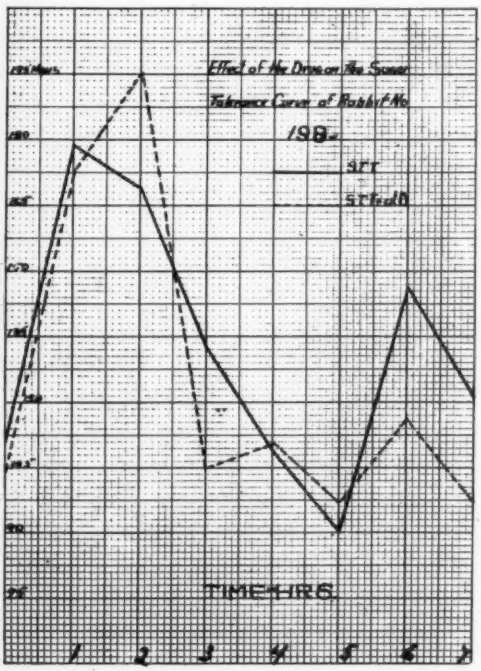

PLATE No. 32. Trial D, Rabbit No. 198. Effect of the citrated alkaloids on the blood sugar.

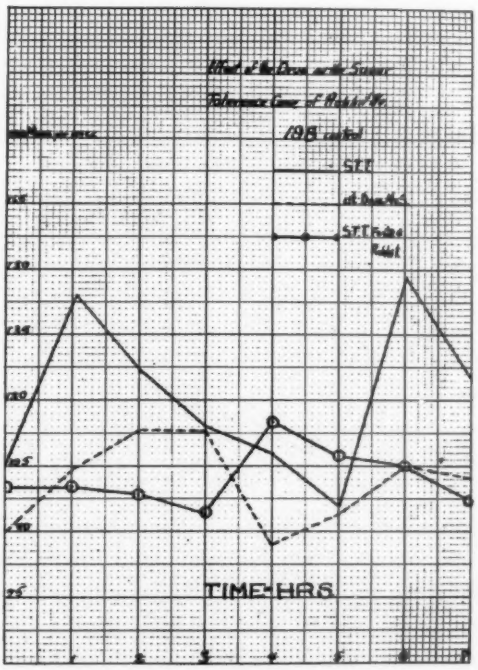

PLATE No. 33. Trial D. Rabbit No. 199 Control.

Preliminary Toxicological Tests

The author mentioned, in the historical introduction, that the use of the infusion of *M. Charantia* was well known and that no toxic effect had ever been observed. It is also well known that some diabetics dry the vine in the sun, grind it as fine as possible, and use the whole drug, obtaining the same antidiabetic effect as with the infusion.

Because of the great responsibility involved in a clinical study of the drug on human beings, it was deemed desirable to make some toxicological tests on rabbits, albino rats and goldfish.

An infusion from 100 grams of drug was concentrated *in vacuo* and an amount equivalent to 50 gms. of crude drug was given to each of the two rabbits. Following administration of the drug, the respiration rate was observed to be regular, the heart functioned normally and even after one week no toxic manifestations were noticed.

Five grams of the drug in very fine powder was suspended in distilled water and given to each of two rabbits; to a third, ten grams was similarly administered. No toxic effects were noticed in any case over a week of close observation.

The crude alkaloidal fraction was dissolved in normal saline solution and 56 mgms. given to a rabbit orally, with no toxic effect observable.

Also, a solution of 14 mgms. of the same preparation was injected intraperitoneally into an albino rat. Again no evidence of toxicity was noticed.

The alcoholic extract was also tested for toxicity. One hundred and fifty gms. of No. 60 powder was exhausted for three weeks with cold 95 per cent. ethyl alcohol. The alcohol was evaporated with an electric fan and the extract was dried in a vacuum oven at twenty-five inches of vacuum. The dried extract was defatted and mixed with cornstarch. One gram of this powder was mixed with crushed rabbit food pellets in a mortar and three sixty-gram albino rats were fed with this mixture. For two days the three rats refused to eat the food. One was then removed and fed on a normal diet as a control, the other two decided to eat some of the drug mixture. After three days the latter died while the control was perfectly normal. In another experiment the powdered alcoholic extract was suspended in

water and given by stomach tube to a rabbit, the dose of extract being equivalent to ten grams of crude drug. The animal was not normal for one week, losing its appetite and developing a mild diarrhea; nevertheless the animal survived.

Because of this observation a further test was made on another rabbit to which extract equivalent to 100 grams of drug was given per os. This extract was prepared by exhausting the drug with hot alcohol. The toxic effect was manifested immediately in the lowering of the respiration rate, the heart beat and motility. After about two hours the animal lapsed into a prolonged coma, for fifteen hours. The next day the rabbit refused to eat food, drank water excessively and developed an intense diarrhea. During the next ten days the rabbit was abnormal, and lost 500 gms. in weight. After determining the blood sugar, which was normal, the animal was killed. The liver was removed and three yellow spots were observed on it. The gall bladder was about five times greater than normal. It was yellow in color and showed two ulcers on the sides. It appeared that the extract has an injurious action on the liver and the gall bladder.

In Part I of this study it was mentioned that a saponin-like substance was present and that positive tests were observed when different qualitative reactions were applied as recommended by Reichard (21). A hemolytic test was performed by the department of bacteriology, a negative result being obtained. The saponin was removed with boiling water, the gum precipitated by ethyl alcohol, the filtrate concentrated and precipitated with baryta water. The resulting saponin barium compound was suspended in distilled water and carbon dioxide bubbled through until all of the barium carbonate was precipitated. The filtrate was shaken with chloroform to remove the saponin-like substance. On this product the hemolytic test, as recommended by Kolmer (22), was applied. Negative results were obtained. It is possible that the method used for the isolation of the saponin destroyed the hemolytic properties of the compound.

Further observation of the saponin was carried on with gold fish. For this observation different tests were performed in order to be sure that the fish were killed—not by a glucoside, but by the saponin.

Saponin was extracted with boiling methyl alcohol and precipitated with absolute ethyl ether. A 0.88 gm. portion of the crude saponin was boiled in water, filtered and three fish were placed into

this solution. In the first two minutes the fish were very excited, in five minutes two were dead and in ten minutes the third fish died.

The drug which had been exhausted with hot alcohol was boiled with water to make a 5 per cent. infusion. Two fish were placed in 200 cc. of infusion mixed with 200 cc. distilled water, and two others in 400 cc. infusion. After two hours all of the fish were alive proving that the saponin-like substance had been removed previously.

A 5 per cent. infusion of the crude drug was then prepared. Two fish were placed in 50 cc. of this infusion, mixed with 250 cc. water; two in 100 cc. of infusion mixed with 200 cc. of water; and two in 200 cc. of infusion mixed with 100 cc. of water. In the first experiment both fish remained alive; in the second test both died in twenty-five minutes, and in the last experiment all of the fish died in ten minutes.

The last toxicity test was done with a Lloyd alcoholic extract, vacuum dried. This extract was prepared with cold alcohol 95 per cent., so that not much saponin is present.

Twenty-five gms. of this extract was boiled three times in distilled water and diluted to 100 cc. In one experiment 40 cc. of this was diluted with water to 300 cc. and in another 60 cc. was diluted to 300 cc. Two fish were placed in each dilution with no evidence of toxicity in either case. These experiments conclusively prove that there is a saponin-like substance in the drug that is toxic to fish and that the glucoside removed by 95 per cent. alcohol and soluble in boiling water is non-toxic to fish.

Summary and Conclusions

A preliminary toxicological and pharmacological test of the drug *Momordica charantia L.*, used empirically in Puerto Rico for the treatment of diabetes mellitus, has been made. Among the findings reported are the following.

A. Pharmacological Studies

(1) The effect of the drug upon the glucose tolerance test on rabbits has been studied. Results are presented in Trial A, in which the effect of the infusion is shown to be very irregular with rabbits of high tolerance, but if the concentration of the drug is increased the effect can be normalized. In Trial B the effect of the same

infusion showed marked hypoglycemic properties. In Trial C a comparative study between the action of the crude hypoglycemic substance, and the action of the crude crystalline substance is demonstrated, and shows very clearly that the blood sugar is markedly reduced. A greater effect was observed on one rabbit to which a double dose had been given, the blood sugar being normal at the end of the first hour. Trial D shows that the citrated crude alkaloids do not have any hypoglycemic action but rather a slight hyperglycemia is noticed.

B. Toxicology

In the preliminary toxicological observations the following facts were disclosed: A saponin-like substance, toxic to gold fish; a glucoside in the infusion, non-toxic to gold fish, rabbits and albino rats are present. The alcoholic extract showed a marked toxicity to rabbits and albino rats. Autopsy of a rabbit showed the liver to be injured and the gall bladder.

The author strongly emphasizes once more that the data available in all phases of the research are not sufficient to reach clear and definite conclusions. Nevertheless, it appears that the infusion, as used by the natives in the treatment of diabetes, has definite hypoglycemic action, which is enhanced when a crystalline substance extracted from the drug is used. Also no toxic effects are noticed when using the drug as such. It seems to the author that the results thus far obtained demonstrate that the drug has possible clinical application in diabetes and that it is quite possible that its mode of action may be different from that of insulin.

However, it is not recommended that this vine, or the crystalline substance isolated from it, be used for the treatment of diabetes in human cases until a more complete study of its toxicity and possible value has been made.

Acknowledgment

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A PIG IS NO HOG—HUMANS MAY BE

Man in his eating habits rarely exercises that innate good judgment observed among animals. This good judgment, which is instinctive, is obstructed by the example set for us as children by our elders. The gastronomic feats of famous gourmands of the past may make us feel much better by comparison, but yet we have a long way to go in order to achieve diets most conducive to health and efficiency.

By T. Swann Harding

THERE is one thing to be said for a pig's concept of etiquette. Nothing will induce him to make a hog of himself, except the natural process of growth. In other words the pig is one animal that will not overeat even if given unlimited quantities of food that it likes. Agricultural authorities inform us that the pig can safely be permitted to feed at will, with excellent results, if expediting its progress to the slaughter pen can be called that from the pig's standpoint.

In fact pigs generally do better when self-fed than otherwise. They reach for the sodium bicarbonate less often. They even balance their own rations very scientifically if various feeds are offered them in different compartments or containers. They will also eat small amounts at a time quite daintily. Thus they lessen food waste and obtain maximum energy efficiency from their feed. Self-fed pigs also have more cheerful dispositions than pigs fed by human direction.

Now it cannot be said that the pig learned its wise food habits from human beings. For man is by nature a potential glutton. It wasn't many years ago when American hotels served simply staggering table d'hote meals. In 1794, too, Brillat-Savarin speaks of eating huge meals in America such as one at the home of a Connecticut farmer who served corn beef, a stewed goose, a magnificent leg of mutton, vegetables of every description, and immense jugs of cider at one meal.

We should probably content ourselves with any one of those meats at a meal now. But in the old days eating was intemperate in the extreme. A few powerful meat eaters of the fifteenth century are duly reported in history to have disposed of 2 great boars, 12 great oxen, 40 sheep, 12 hogs, 12 swans, 80 geese, 3 pipes (or 2 hogsheads) of wine, and 32 barrels of beer at a first-class funeral, 160 people being present.

A proper feast of that day consisted of two courses including brawn (chopped parts of the hog), bacon and pease, beef, boiled chicken, roast goose, roast pig, veal, lamb, fritters, spiced apples and pears, bread and cheese, spiced cakes and wafers, bragot (made of ale, honey and spices), and mead, fermented honey water. Special feasts were common and stupendous.

The Corpus Christi Gild at Coventry records an old-fashioned lenten goose and venison dinner, while that of Bury St. Edmunds at its feast in 1490 consumed 10 lambs, 2 calves, 16 pigs, 70 chickens and 100 pigeons. There were limitations even then, of course; it was considered ill-mannered to cram the face with food like an ape or to wipe the teeth on the tablecloth. In those days swans, gulls, herons, cranes and peacocks were all eaten, as well as many fish and sweets. Few salads were known though peas, leaks, cabbages, onions, turnips and parsnips were used. It is melancholy to think of parsnips having been so long misguidedly regarded as edible by the human race.

Certain individuals did very well by themselves in those days too. The British Medical Journal of July 24, 1909, deviated into a discussion of royal appetites. Charles the Fifth was cited as an enormous eater who breakfasted at 5 A. M. on a fowl seethed in milk and dressed with sugar and spices; then slept again and dined at 12 on some twenty dishes. He afterwards supped twice, once after vespers and next at midnight or about 1 A. M. The last was said to have been his really substantial meal of the day. After meat he ate sweets in great quantity.

At the feast of the Golden Fleece the Emperor was seen to make steady progress through "sod beef, roast mutton, baked hare . . . and a capon." He drank a quart of Rhine wine to put this nutriment in soak. A Holy Roman Emperor could scarce do less, he no doubt reasoned. In spite of gout and indigestion he continued to eat hugely, and the envoy of Venice thought his feats of appetite worth reporting to the Senate of his Republic. His faithful attendant had seen long files of mules coming from all over Spain and Portugal with delicacies for Charles' palate, laden as it were with bile and gout—as the envoy cheerily expressed it.

At a banquet of Henry II the Queen Mother, Catherine de' Medici managed to eat so much she nearly died. Louis XIV often took four platefuls of different soups at one meal, then a pheasant, a partridge, a large plateful of salad, two large slices of ham, mutton

stewed in garlic, a plateful of stewed fruits, with some pastry and several hard boiled eggs as a chaser. His diet produced a diary recording a long series of intestinal storms, gout, physick, clysters and bleeding. When he went on a diet he merely ate toast, pigeon soup and three roast chickens at a luncheon.

The Bourbons were omniverous overeaters. Napoleon also liked his potatoes, haricots, lentils, cutlets, grilled breast of mutton and sausages at a meal topped off with Italian macaroni and cheese. At dinner he liked a roast fowl, ices, coffee and cream, chocolate, champagne and dessert; this he ate between 6 and 9 P. M.—but he kept a haunch of venison nearby in case he got hungry thereafter.

Victor Hugo piled all sorts of incongruous foods on his plate and ate with great gulps. He was probably the most noted of all lyric burpers. Joubert was his exact opposite, ate scarcely anything and always had indigestion.

According to the British Medical Journal of June 24, 1911, Francesco de Medici, Grand Duke of Tuscany (1541-87) was a condiment fancier. Everything he ate must be mixed with the most fiery seasonings—ginger, pepper, nutmeg, cloves. "Before, during and after these meals" he would swallow raw eggs filled with red pepper just for the fun of it.

His second choice in edibles was raw onions, radishes and any other available roots, together with enormous quantities of the most robust and pugilistic cheese. "When Francesco had had his fill of these dainties, he would drink immense beakers of iced water, plunge his head and hands in snow, and go to bed in iced sheets." This diet was said to have accounted for his fits of appalling violence and his notorious moodiness, and who are we to dispute it?

In its issue for June 30, 1934, the same British Medical Journal commented on King James I of England as a heavy trencherman and an indiscriminate drinker, and included a Latin account of his death. He is recorded as having "left this mortal and troublesome life" March 27, 1625. We also read:

"It is true that the most serene King was gifted by Nature with an excellent constitution, but as age came on it was obvious that this was impoverished chiefly by errors in diet and by external causes. . . . His stomach by its want of tone was many times distended by wind and its movements hindered by symptoms of imperfect digestion, so manifest that he was continually drinking strong wine to give himself ease. To this weakness of the body must be added

many errors of diet, for although moderate enough in ordinary food, because he was edentulous he never masticated it but bolted it whole.

"Moreover in the matter of garden fruit he grossly exceeded, greedily eating it at any time day or night. Again in drinking he was shockingly intemperate, mixing his liquor so that at any one time he took ale, beer, sherry and sweet white French or Greek wine, which were his favorite and customary beverages even when they were ropy and full of lees. From these habits it followed that evil humour was bred in him."

Regarding his more intimate symptoms we need say nothing. He declined all medicinal treatments "and so the King of all Monarchs left this earthly prison on March 27th, 1625." His body was opened the next day but no one was ever the wiser for it.

Then there was Louis XVI. Saul K. Padover in his life indicates that this obese bourgeois was a considerable glutton who, though he drank sparingly, undermined his constitution and destroyed his usefulness by an irresistible craving for food. His gormandizing increased with his years and he often ate himself into a state of insensibility, giving rise to rumors of inebriety. Yet save for a little wine at meals he drank scarcely at all.

A normal luncheon for Louis XVI consisted of four cutlets, a fat chicken, six eggs, a slice of ham and a bottle of wine. Moderate in all things else his immoderation in food sapped his will and reduced his energy and dignity. And before he got through he certainly needed all the energy and dignity he could muster.

Samuel Pepys records rather a fulsome meal in his diary under date of January 26, 1660. It consisted of a dish of marrow bones, a leg of mutton, a loin of veal, a dish of fowl, three "pulletts" and two dozen larks, a great tart, a neat's tongue, a dish of anchovies, a dish of prawns, and cheese ad lib. But though Pepys gorged on this it appears that on many other days he ate little or nothing—possibly a cup of chocolate. So he compensated like primitive tribesmen—periods of fast for feats of gorging.

Boissonnade in his Life and Work in Medieval Europe writes that: "In Frankfort, in the fifteenth century, the consumption of meat was as high as 125 to 150 kilograms per head; as much as it was at the beginning of the nineteenth century. A traveller of the period remarks that in the Low Countries and England 'more folk die of too much eating and drinking than of the pains of hunger.' "

In the issue of Blackwood's Edinburgh Magazine for January 1828 a facetious individual writes a scathing review of a book on improving health and prolonging life, by a doctor. This doctor had advised the use of whole wheat bread. In fact he found that a dog could be kept alive on such bread whereas it died quickly on white bread—which looks as if he was on the track of vitamins even then. But the reviewer found such bread inedible. He also deplored water drinking and he made great fun of the spare eating habits advised by the doctor.

Instead he preached great irregularity of habit in eating, drinking and sleeping and said only thus could he thrive. He dismissed with scorn the spare, monastic diet the doctor recommended for literary people and then himself recommended his own diet as the proper one for a writer. He ate as follows:

For breakfast at 9 A. M. two hot penny rolls; two toasted rounds of a quartern loaf and one of butter toast, two hen's eggs (not earocks or pullets), a small ashet or platter of fried mutton-ham, jelly and marmalade quantum suff., washed down with two bachelor's bowls of Congo tea, and a caulker—dram or drink.

For luncheon at 2 P. M. he had caviare, anchovies, pickled salmon, cold howtowdie and ham, a pint of porter, a loaf, two glasses of Madeira wine. For dinner at seven—a round of beef, hodge-podge, cod-head and shoulder, roast turkey, plum pudding, jellies, a few tarts, two pots of porter, four glasses of hock and four of champagne, two of port and a bottle of claret. For supper at 11 P. M. ending the day—oysters, crabs, dried haddock, welsh rabbit, a pint of porter and two jugs of toddy.

A man might live reasonably well on such a diet, for a while at least, if sedentary. Naturally nutrition of human beings was carried on somehow, and with fair success, many thousands of years before Hopkins and Funk arose with vitamins in their hands. Indeed five centuries before Eyckmann demonstrated the significance of such accessory food factors the Florentines had discovered them for themselves and knew the value of lime juice in scurvy and cod liver oil for rickets. They even had found value in the water in which cabbage had been cooked.

Many primitives also sought out what we today find to be highly individualized sources of calcium and other minerals and of vitamins. Thus certain American Indians made an excellent ration by pounding

hackberries, containing large amounts of calcium, up with fats, fruits and parched corn.

Whether human gluttony is what it used to be is another matter. It is not so long, of course, since "Diamond Jim" Brady ate such typical dinners as follows: Five pounds of caviar, eaten with a spoon and washed down with chilled orange juice; two dozen oysters, a mammoth baked fish, a saddle of lamb and a pint of ice cream. There Brady's vices ceased as he neither smoked nor drank, but he liked to hear champagne corks pop.

About ten years ago a popular restaurant chain advertised all the patron could eat for from 60 cents to $1.00. But the average "guest" was not greatly deflected from his normal eating habits; he wanted mainly a second cup of coffee or helping of dessert. He would not try fried chicken for breakfast, but he did show partiality for the grapefruit juice cocktail and for scallops, when they cost nothing extra. Only one in ten asked for an extra helping of the main order. Most luxuriated in extra trimmings.

Yet even this was said to increase costs enough to make the venture precarious financially unless patronage could be stepped up 100 per cent. The important thing from our standpoint is that marked gluttony failed to appear. There were occasional eating races, but this did not occur often. Now and then also a "guest" insisted he truly was that and demurred at paying! The restaurants knew how to deal with that.

How scientifically the patrons selected their foods is not known but the trend was in the direction recommended by newer nutrition science. Nutrition specialists hold that a well-ordered appetite is capable of indicating the amounts and kinds of foods an animal needs over long periods and under varied conditions of activity. For instance dogs will tend carefully to regulate their intake of calories to correspond with their degree of activity. Exercise them more and they eat more, less and they cut down. Lower animals in general appear unerringly to select soundly balanced diets so long as they are in the wild state.

Rats and mice also are capable of choosing adequate diets for themselves if given a well-rounded selection of foods. They take such diets as promote what nutrition scientists regard as "normal growth." They unerringly select better-grade in lieu of low-grade proteins. They wisely seek out foods that contain the vitamins they need. Even if you try to fool them by making inferior diets smell

like good ones, they will go only so far. Quite soon they will revert to the seemingly less appetizing but actually more nutritious diet and save their health.

Rats can also detect poisoned food and will refuse it. They will voluntarily starve rather than eat it, at least if the poison is selenium in various compounds. They can even distinguish between diets that differ in selenium content by quite small increments, avoiding the more poisonous, gingerly tasting only the slightly poisonous. Rats always restrict their food intake when on a toxic diet too.

If rats are depleted of what was formerly called vitamin B and are offered their choice of a food devoid of this vitamin or a diet rich in it, they will invariably select the latter. If, however, they are not depleted they will eat either diet. The preference is exhibited only when they lack the vitamin in their bodies. Such a depleted rat will prefer to continue indefinitely on the same monotonous diet containing a bare adequacy of the vitamin rather than experiment with novel diets devoid of it.

But if the vitamin-containing diet is placed before the rat in such quantity as to give him a vitamin excess, he will eventually quit restricting himself to it. He gets self-educated. He can also be educated to prefer a vitamin-rich to a vitamin-poor diet, if started young. But if the vitamin is slipped into the diet as a minute quantity of some concentrate, the rat may not recognize its presence. But give the vitamin-rich diet a distinctive flavor with cocoa or meat extract, and the rat grabs at it.

Hence scientists think that the vitamin-depleted rat's ability to discriminate between diets depends on no vague instinct, but rather on an association between the distinctive character of the diet and experience with its beneficial results. If the benefit is not so apparent the rat does not appear so wise. In any case he seems wiser than human gluttons.

For some years now Dr. Clara M. Davis had been permitting just-weaned infants to select their own diets from groups of simple, unsophisticated foods. She has found over a period of ten or twelve years that youngsters can select an optimum, well-rounded diet from such simple, natural foods, provided their appetites have not been perverted previously by eating complex prepared foods. They will sometimes gorge on one food, like banana or egg, for a while, but they survive and have less stomach trouble than carefully managed infants.

Other workers have found that girls between six and thirteen also did a good job of selecting a scientific food intake if given freedom of choice on a sound basic diet. The children would eat so as to maintain health and preserve their teeth. They were permitted to have as much or as little food as they desired. They took proteins, calories, vitamins and minerals in just about the proportions nutrition specialists would recommend.

In fact the nutritionists said they could not have selected a better diet themselves, and it takes a good deal to make them say that. Other scientists have claimed that the instinct of food selection has to be taught. One, more impish than his fellows, declared that custom played so great a part in children's choice of food that youngsters brought up on cod liver oil would not even eat jam unless it was made attractive to them by dashing in some of the oil.

But about a year ago Dr. Davis reported on the self-selection of diet by children of from six to eleven months which had not been trained to any diet. Her experiments on these subjects lasted from six months to four and a half years. She permitted them to select freely among the following simple foods: Sweet milk, lactic milk, sea salt, apples, bananas, orange juice, fresh pineapple, peaches, tomatoes, lettuce, oatmeal, beets, carrots, peas, turnips, cauliflower, cabbage, spinach, potatoes, bone jelly, corn meal, barley, ry-krisp, beef, lamb, chicken, sweetbreads, brains, liver, kidney, wheat, bone marrow, haddock.

The children remained healthy and happy. They took in just such individual food elements as they needed to thrive. They did not succumb to the usual children's complaints. In general their self-selected diets approximated those nutritionists would advise. In the beginning they tried everything—even hopefully chewing trays, spoons, dishes and paper napkins. But they gradually restricted themselves to foods they liked and did not thereafter show such wide range of choice.

The whole thing rests on being confined to natural, unprocessed, unpurified foods and getting no fancy or complex dishes. Each child achieved dietetic salvation by its own route. One breakfasted regularly on a pint of orange juice for a while, plus a mess of liver; another supped on a number of eggs with bananas and milk. But gluttony was deprived of its power to harm when restricted to simple wholesome foods. Yet a pig knows enough not to make a hog of himself if he can help it.

WAR PRODUCTION BOARD
BUREAU OF INDUSTRIAL CONSERVATION

The War Production Board has released lists of materials which are grouped according to their scarcity and general availability for use in civilian industry. Since many of these items are of interest in pharmacy, these lists are reprinted here.

GROUP I

Materials Most Vitally Needed for War Purposes; Not Generally Available for Civilian Needs

Metals

Alloy Steel
- Iron Alloys
- Alloy Steel
- Wrought Iron

Aluminum
Aluminum Scrap
Cadmium
Calcium-Silicon
Chromium
Cobalt
Copper
Copper Scrap
Iridium
Lead
Magnesium
Nickel
Tin
Tinplate and Terneplate
Tungsten
Tungsten (High Speed Tools)
Vanadium

Chemicals

Alcohol Methyl
Chlorinated Hydrocarbon Refrigerants
Chlorinated Hydrocarbon Solvents
Chlorine
Toluene
Diphenylamine
Formaldehyde
- Paraformaldehyde
- Hexamethylenetetramine and Synthetic Resins therefrom

Phenols
Polyvinyl Chloride
Sodium Nitrate (pure)

Miscellaneous

Agar
Asbestos (Long Fiber)
Burlap and Burlap Products
Cashew Nut Shell Oil
Corundum
Cotton Linters
Graphite (Madagascar)
Hemp Seed
Jewel Bearings
Kapok
Manila Fiber and Cordage
Pig and Hog Bristles
Rubber, Crude, and Latex
- Chlorinated, Synthetic

Shearlings
Silk
Silk Waste
- Silk Noils
- Garnetted and Reclaimed Silk Fiber

Sperm Oil
Tin Cans
Titanium Pigments
Tung Oil

GROUP II

BASIC MATERIALS THAT ARE ESSENTIAL TO THE WAR INDUSTRIES, BUT WHOSE SUPPLY IS NOT AS CRITICALLY LIMITED AS MATERIALS OF GROUP I

Acetone
Ammonia (Anhydrous)
Antimony
Arsenic
Barium Carbonate
Beryllium-Copper Alloys
Borax
Calcium
Carbon Tetrachloride
Camphor
Casein
Glaseine
Kraft Paper
Citric Acid
Cocoanut Oil
Cork
Cotton Duck
Cryolite
Diamond (Industrial)
Diamond Dies
Flax
Fish Liver Oils
Glycerine
Hides and Leather
Iodine
Jute and Products
Linseed Oil
Manganese
Mercury
Mica Splittings
Molasses
Molybdenum
Natural Gas
Natural Resins
Nylon
Parchment Paper
Palm Oil
Phosphorus
Platinum
Potassium Perchlorate
Potassium Permanganate
Quartz Crystals
Quinine
Rape Seed Oil
Rayon
Rhodium
Rubber (Reclaimed)
Shellacs
Sisal
Steel, Carbon
Scrap
Spirits, Distilled
Sugar
Teak
Tanning Materials
Tetra Ethyl Lead
Titanium Pigment
Vitamin "A" Products
Wool
Zinc (all grades)

GROUP III

MATERIALS AVAILABLE IN SOME QUANTITIES FOR OTHER THAN STRICTLY WAR PURPOSES. HOWEVER THE USE MAY BE RESTRICTED BY ACCOMPANYING MANUFACTURING LIMITATIONS. RESTRICTIONS ARE COMMONLY IMPOSED, BUT SUPPLIES ARE NOT CRITICALLY SHORT, EXCEPT IN THE CASE OF IRON AND STEEL

Substitute Materials

Asbestos (Common)
Asphalt
Brick and Tile
Cement
Ceramics
Clay
Feldspar
Glass
Gold
Iridium (Plating)
Lignin
Limestone and Marble
Lumber and Millwork
Mineral Wool
Paper (except items under II)
Paper Board
Plywood

Coal and Coke	Wall Board	Salt
Slate	Wood and Products	Silver
Sulfur	Wood Fibres	
Concrete	Wood Flour	
Cotton	Wood Pulp	

Materials Available in Varying Amounts for Substitutions

Ammonia (Aqueous)	Petroleum Products	Rosin
Bismuth	Crude Oil	Ruthenium
Cellophane	Gasoline	Silicon and Alloys
Cottonseed Oil	Lubricating Oil	Soy Beans and Products
Gypsum and Products	Paraffin	Protein
Hair (Cow, Horse)	Plastics (Cellulose,	Oil
Palladium	Acetate, Butyrate)	Turpentine
		Uranium

War Materials Presently Available for Substitutions in Critical Civilian Industry

Basic Low-Carbon Steel	Gray Cast Iron
Bessemer Steel	Malleable Iron

The Current List of Medical Literature

All persons interested in keeping abreast of the important papers in the field of medicine, with its related sciences, should not overlook the opportunity that is afforded in the so-called "Current List of Medical Literature."

A group of scientists who wished to extend the usefulness of the Army Medical Library and its excellent collection of periodicals and books have by their initiative and effort established the "Friends of the Army Medical Library." This group, now in its second year of service, distributes a weekly list of scientific papers which are divided into fifty different categories. Each paper is described by title and author's name. By this means any person may scan a list of important papers and in case one or more papers are of interest they may be obtained complete in microfilm at the very reasonable cost of twenty-five cents for each complete article not exceeding twenty-five pages in length and ten cents for each additional ten pages or fraction thereof.

Considerable favorable comment has resulted in this worthy and valuable service and those not familiar with it should write to Medicofilm Service, Army Medical Library, Washington, D. C. The subscription price for the "Current List," issued weekly, plus "Recent Book Acquisitions," issued at frequent intervals, is $5.00 a year.

SELECTED ABSTRACTS

From the Current Scientific Literature

Agar Production in New Zealand. *Pharm. J. 94,* 68 (1942). The possibilities of agar-agar production on a commercial scale in Australia and New Zealand have been under consideration for some time and reports of the progress made appear in the current issue of the *Bulletin of the Imperial Institute.* In New Zealand waters eight species of *Gelidiaceæ* occur and of these two species seem to offer commercial possibilities owing to their relative abundance, easy identification and good agar yield. Last year the Department of Scientific and Industrial Research made arrangements for the collection of one of the larger species, *Pterocladia lucida,* which has fronds 8 inches long, and between March and August almost 1,300 lb. was gathered, of which 1,000 lb. came from a 30-mile stretch of coast. The harvesting was carried out mainly by children, and the dried weed delivered to Wellington cost 9d. per lb. After digestion, filtration and freezing, a yield of about 15 per cent. of agar was obtained, but the facilities available were rather makeshift so that a higher percentage should be possible when further large-scale experiments have been carried out. New Zealand's peace-time needs amount to 13 tons annually, but even if this quantity cannot be produced locally whatever is obtained should prove a valuable contribution to Britain's war-time requirements for the preparation of bacteriological media.

Agar is also being produced in Australia from a red seaweed, *Gracilaria confervoides,* which is easily harvested. Much work still remains to be done on the rate and density of growth of the weed to ensure a continuity of future supplies, but present knowledge permits a steady supply sufficient to meet all or most of Australia's essential needs. The agar produced has a higher ash and nitrogen content than the Japanese variety and a somewhat lower gelling power. On it most bacteria grow well, especially pathogens, but growths are rather poorer with *Rhizobium* and allied soil bacteria. This, however, may be due to traces of copper derived from apparatus used in the preparation of the sample.

Oral Herpes (Simplex) Manifestations (Cold Sores, Canker Sores, etc.) and Their Treatment With Vitamin B Complex. L. W. Burket and G. C. Hickman. *J. A. D. A. 29,* 411 (1942). Several different types of mouth sores (herpes labialis, canker sores, recurrent aphthal and aphthous stomatitis) were formerly believed to be of different etiology. There is now evidence that all of these conditions represent manifestations of the herpes simplex virus. The authors review the various factors concerned in the production of cold sores and canker sores as well as the many and varied forms of treatment that have been recommended.

In 1932 Gerstenberger (*Am. J. Dis. Child. 26,* 309 (1932)) reported the successful treatment of herpetic stomatitis and labialis with yeast tablets. The present authors studied the effect of the vitamin B-complex with thiamine on a series of herpes cases. They found that the B-complex and in some case thiamine alone not only had a prompt therapeutic effect but it prevented recurrence when other forms of conservative therapy had failed.

Thiamine hydrochloride 5 mg., riboflavin 5 mg. and nicotinic acid 50 mg., or their equivalents, per day for several days gave prompt and satisfying results. Recurrences were controlled by a maintenance dose of 1 mg. of thiamine hydrochloride per day. Natural sources of the vitamins are recommended for maintenance purposes.

Nutritional Deficiency and Infection. J. G. Wooley and W. H. Sebrell. *Pub. Health Rep. 57,* 149 (1942). There is a considerable amount of evidence which suggests a relationship between deficient diets and infections in experimental animals. This paper reports on an investigation carried out to determine whether there was a relationship between riboflavin and thiamine deficiency and susceptibility to fatal infection with pneumococcus in mice.

Mice were divided into several groups each of which was fed on a diet deficient in thiamin and riboflavin. The degree of deficiency varied in each group. Each group after having been on the restricted diet for 14-21 days was divided into two parts, one serving as a control. The mice in the experimental group were inoculated with pneumococcus intranasally and the controls given intranasal applications of sterile defibrinated rabbit blood diluted with sterile broth. There was a striking difference in both the increase in mortality as well as

rapidity of death in those mice on the more highly restricted diets. Additional experiments indicated that this effect was not due to a restricted *total* food intake. Another very interesting finding was that if riboflavin or thiamine even in large amounts were administered at the time of the inoculation to animals on restricted diets it did not reduce the mortality, indicating that protection could only be afforded by regular intake of adequate supplies of these substances.

The Storage of Certain Medicaments With Protection Against Light. J. Büchli and V. Kurer. *Pharm. Act. Helv. 15,* 323 (1940) through *Squibb Abstr. Bull. 15,* 136 (1942). Neutralized Olive Oil, Paraldehyde and Spirit of Ethyl Nitrite were investigated as regards their stability toward light. The results obtained indicate that the neutral olive oil must be stored only in completely filled bottles which must be amber glass. If stored in incompletely filled bottles, storage should be only for a short time and the bottles should be wrapped in black paper. Paraldehyde, if 0.2 per cent. acetaldehyde is added, is stable if stored in completely filled dark brown bottles. Spirit of Ethyl Nitrite must not only be stored in dark brown bottles but also wrapped in black paper.

Nasal Inhalant Preparations Containing Liquid Petrolatum Omitted From N. N. R. *J. A. M. A., 118,* 378 (1942). The Council on Pharmacy and Chemistry of the American Medical Association, acting upon accumulated evidence, has decided to omit all brands of inhalant nasal preparations containing mineral oil from the N. N. R. Many reports have been made of lipoid pneumonia resulting from the use of such products where small amounts were aspirated into the lung tissue. Vegetable oils may or may not be dangerous; this has not been established.

It is generally conceded today that vasoconstriction of nasal tissues can best be achieved by isotonic aqueous preparations.

The Use of Sulfonamide Derivatives as a Solution to the Problem of Bacterial Contamination in Stored Plasma. M. Novak. *J. A. M. A. 118,* 513 (1942). Bacterial contamination has been the most serious obstacle to the preservation of plasma in the liquid state. Although several methods have been proposed to minimize the dangers involved in the accidental use of contaminated plasma, none have proved adequate.

The chances of bacterial contamination of plasma during collection are rather great and some risk is run in the blood being infected due to a pre-existent bacteremia in the donor. The real hazard, however, is in the multiplication of these bacteria rather than their initial presence.

The use of various sulfonamides has been investigated insofar as their ability to act as a bacteriostatic in human plasma under its conditions of storage (4° C.-24° C.). It was found that 0.2 per cent. of sodium sulfathiazole completely eliminated all dangers resulting from contamination. Blood from donors is drawn directly into a solution containing both sodium citrate and the sodium sulfathiazole. The antibacterial effect is thus obtained from the very moment the blood is removed from the donor's vein. The solution consists of 1.5 gm. of sodium citrate and 1 gm. of sodium sulfathiazole sequihydrate in 50 cc. of physiologic solution of sodium chloride. The solution is autoclaved in the regular flask into which blood is to be drawn. This amount of the sulfonamide makes a final concentration of 0.2 per cent. when 450 cc. of blood is added. If tests for sterility are desired they should be made with mediums containing para-aminobenzoic acid to neutralize the bacteriostatic action of sulfathiazole as suggested by Janeway and Shwachman (*J. A. M. A. 116,* 941 (1941)).

According to Novak, plasma so preserved is quite satisfactory and the need for expensive processing equipment is unnecessary in most instances.

The Use of Human Plasma in Hemophilia. J. B. Johnson. *J. A. M. A. 118,* 799 (1942). In recent years several agents have been proposed in the treatment of hemophilia. The most effective treatment is the transfusion of compatible blood. The use of whole blood is fraught with considerable complexity since the number of transfusions may be considerable and there may develop intragroup incompatibilities (*Ann. Int. Med. 13,* 2306 (1940)).

For many years it has been known that the plasma of normal blood contains a substance effective in reducing the coagulation time of hemophilic blood to normal. This substance has been shown to be associated with the globulin fraction of the plasma.

The author reports on the effectiveness of dried human plasma in the management of hemophilia. Plasma dried by the "lyophile" process maintains its ability to reduce the coagulation time in hemophilia in a manner similar to that of fresh citrated blood. Storage of the processed plasma does not destroy its thromoplastic activity and typing and cross matching are unnecessary.

Of particular interest is the use of dried plasma in the management of minor hemophilic conditions such as hemarthroses, hematuria, and control of hemorrhage following tooth extraction. One almost totally disabled patient to whom weekly injections of plasma were given is reported as having been sufficiently rehabilitated so that he could do light work.

U. S. P. and N. F. Notes

The United States Pharmacopœial Revision Committee has announced that the Assay for Fluidextract of Ergot has been dropped because of the lack of a satisfactory method of measuring both the ergotoxine-ergotamine group and the ergonovine content. It is also stated that no method seems to be available for the manufacture of a stable Fluidextract of Ergot.

The one hour frog assay for Digitalis has been replaced by a new method based on the lethal activity for cats. It has been shown that results obtained by the frog assay are not in accordance with the observed activity of the drug on humans.

The replacement of Oil of Lavender in certain preparations with Oil of Cedar Leaf has led the Internal Revenue Department to authorize a "Specially Denatured Alcohol Formula No. 27-B" containing Oil of Cedar Leaf as one of the denaturants. This will make possible the use of such alcohol in the manufacture of Liniment of Soft Soap.

The National Formulary Committee has issued an Interim Revision Announcement which permits the use of 1 gm. of Extract of Strammonium in place of 0.8 gm. of Extract of Belladonna in the formula for Compound Pills of Cascara (Hinkles' Pills). The substitution of Oil of Cedar Leaf U. S. P. in place of Oil of Lavender is permitted in all N. F. preparations for external use in which Oil of Lavender is an ingredient.

SOLID EXTRACTS

A Series of Interesting Facts and Opinions Gathered Here and There

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A new sulfonamide, succinyl sulfathiazole, has been announced by Sharp & Dohme of Philadelphia. Tried at Johns Hopkins by Dr. E. J. Poth and his associates, this new drug offers promise in the preoperative preparation of patients for abdominal surgery. After a sufficient amount of the drug has been administered, operations can be performed on the open colon without undue fear of peritonitis or local abscess formation. One of the most important properties of this new drug is the fact that it stays in the intestinal tract rather than being assimilated into the blood stream. Thus it can continue its effect in the intestine by prolonged administration without danger of serious toxicity.

AJP

Some of our outstanding athletes would not pass the physical examination for military service based on the standard height-weight tables. Several workers have shown that in many cases only a specific gravity determination on the subject will give a true picture of the presence or absence of excess fat. For strong muscular men the specific gravity will be relatively high and, consequently, it is possible to tell whether a large girth is muscle or fat. Men with a specific gravity above 1.060 may be classified as not obese regardless of their bulk. The time honored "Archimedes Principle" is the basis of the method used in measuring the specific gravity.

AJP

A new type of sewage disposal plant removes 99 per cent. of solid matter, is odorless, inexpensive and may be set up even in the heart of a residential district. One in a Michigan city is even within 75 feet of a bakery and 60 feet from an auditorium. The process consists in converting the sludge into carbon and then using it to inoculate and deodorize the incoming sewage.

Both acids and nicotine are known so widely as poisons that nicotinic acid has been somewhat handicapped in its public acceptance as a substance to be added to flour. The National Research Council has recommended the word "Niacin" for public use and apparently no one objects although chemists will probably be slow to change.

AJP

Human reactions are greatly sharpened under the influence of red light according to some experiments which have proven that the efficiency of the body seems to be affected by color.

Interesting also is the observation by engineers that the benches of plane workers were required to be a neutral color. Green made the men ill, blue caused drowsiness and red made them fight!

AJP

The extent of poor vision found even among young people is almost unbelievable. For example, in the draftees 13.7 per cent. were rejected because of poor vision. In the air corps 80 per cent. of the applicants were found physically unfit with vision one of the chief defects. With advancing age comes poorer vision but it is estimated that almost one-third of all school children have defective vision.

AJP

Bacterial warfare, involving the dissemination of disease from the air, is theoretically feasible, but actually it would prove difficult and uncertain of accomplishment, especially if practiced on civilized human beings possessing an average knowledge of sanitation. Should an attempt be made by the enemy to drop pathogenic organisms in bombs, the accompanying explosions would probably kill most of the bacteria. If they were dropped on pieces of grain, or foodstuffs or other materials, it is likely that only animals would eat them unsuspectingly, for humans, in times like that, would know better and would have implements handy to burn the matter or spray it with some germicide. Much of the unwanted material would drop on rooftops and other inaccessible places, where the bacteria would have little or no opportunity to survive or multiply.

In the matter of sabotage, involving the planting of germs in reservoirs and other important places, our modern methods of filtration, chlorination and general sanitation should prove equal to the occasion.

Should germ warfare come about due to the desperation of the enemy, every man, woman and child would be in the front line trenches, so to speak, and it becomes, therefore, the patriotic duty of every citizen to acquaint himself fully with details concerning hygiene and general public health.

AJP

Overwork and worry, due to the national defense effort and the war, may lead to lowered resistance in some individuals, and they will prove easy prey to bacteria, found naturally or otherwise. Such sickness is costly, and this expense, both personal and national, is another incentive for every person to remain in good health, to the best of his ability.

AJP

Agriculture and industry have joined hands, and are moving forward to an era in which each supplements the other, and in which together they will achieve new levels of prosperity. The name of this new union, in case you were trying to devise one for yourself, has already been designated as Chemurgy.

AJP

The terrific toll exacted from our energy reserve by the war effort should lead everyone to carefully plan rest periods in order to maintain efficiency and health. When an exhausted worker tries to sleep he worries, fatigue leads to irritability and loss of efficiency.

The program for a long life includes low pulse rate, low blood pressure, low metabolism, a low diet and a low threshold for the sense of humor. To this should be added rest even if only a few minutes at a time for greater endurance and energy and a longer life.

BOOK REVIEW

A Manual of Pharmacology and Its Applications to Therapeutics and Toxicology. By Torald Sollmann, M. D., Professor of Pharmacology and Materia Medica, School of Medicine of Western Reserve University, Cleveland. W. B. Saunders Company, Philadelphia and London, 1942. Sixth Edition, entirely reset. x+1298 pages. Price: $8.75.

The outstanding advances made in many fields such as the sulfonamides, hormones, vitamins, etc., as well as the less widely publicized changes in medical practice have made a complete revision of the former edition necessary. This new sixth edition of Sollmann does exactly what it sets out to accomplish, namely, "to furnish a rather comprehensive outline of current knowledge and conceptions of drug action especially from the point of view of their practical importance in medicine, therapeutics and toxicology."

In scanning through the book this reviewer found it quite up to date in its treatment of the newer materia medica irrespective of the status of the drug, official or proprietary, and it can be truthfully said that from the standpoint of therapeutic modernity it is excellent.

The references listed, covering over 100 pages, have been restricted to only those dated since 1921 but they are selected so as to give information rather than credit to authors, a most commendable method.

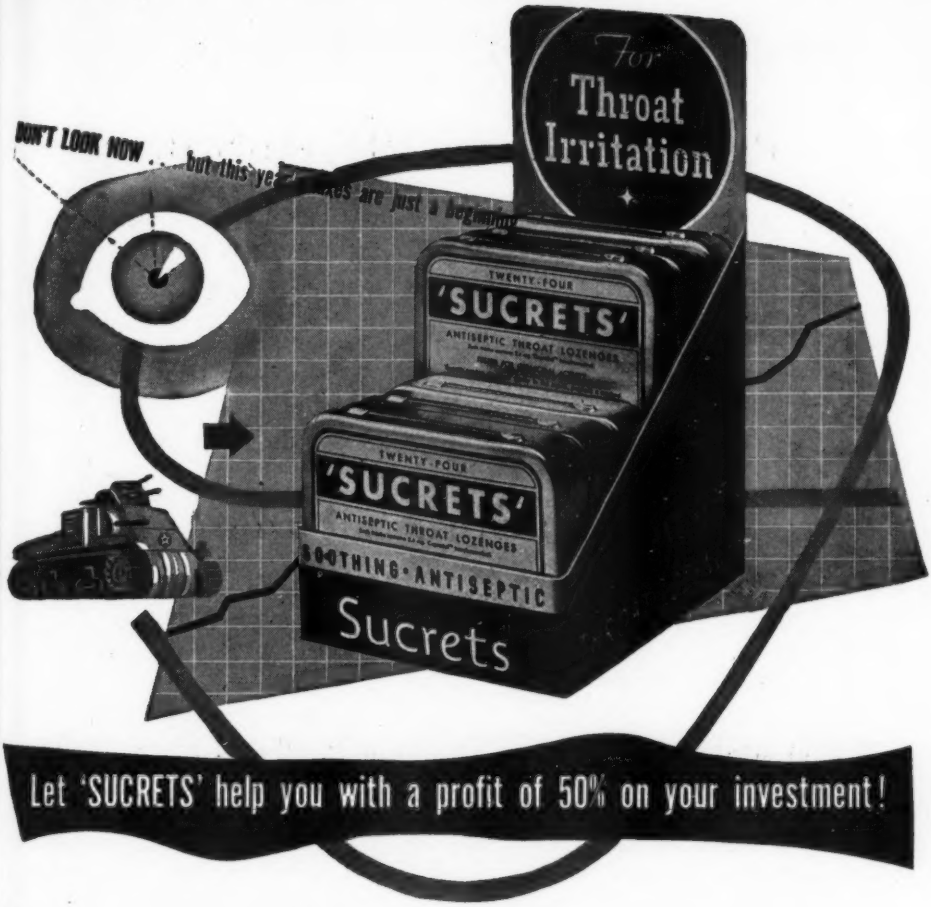
Two minor points of criticism are in order. First, although the U. S. P. XII and N. F. VII are now in page proof, this new work carries the U. S. P. XI titles. This may not have been avoidable without delaying publication but the use of the new titles would have been an improvement. Second, the index is very weak since there are literally thousands of important facts in the text which are not indexed. If the user takes time to look he can find most everything but a more comprehensive index would have increased its value as a quick reference. These criticisms are not intended to detract from the admitted excellence of the book. It is literally packed with information of value to anyone interested or engaged in any branch of medical science.

L. F. TICE.

OUR CONTRIBUTORS

T. Swann Harding until recently was Editor of Scientific Publications of the Department of Agriculture. At present he is serving as a Senior Information Specialist detailed to the Office of the Assistant Director of Information and is specifically assigned to the Food for Freedom Program. This program is without question on a par with our industrial production effort insofar as its importance to the war is concerned. A nation can be overcome just as readily by hunger as it can by superior force of arms and our job is to see to it that both our Allies and ourselves are maintained on diets that make for determined resistance and effective counter-offensive.

Gilberto Rivera, D. Sc., is a member of the Department of Chemistry of the School of Tropical Medicine of Columbia University stationed at San Juan, Puerto Rico. Dr. Rivera did his graduate work in the States and he is particularly interested in drugs native to Puerto Rico and South America. Many of these drugs have not been fully investigated from the scientific standpoint and the work on Momordica is typical of the opportunities for investigation that these drugs afford.



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